## REMARKS/ARGUMENTS

After the foregoing Amendment, claims 1-14 are currently pending in this application. Claim 1 has been amended to more distinctly claim subject matter which the Applicants regard as the invention. Applicants submit that no new matter has been introduced into the application by these amendments.

### *Allowable Subject Matter*

The Examiner is thanked for indicating that claims 3-14 contain allowable subject matter.

### *Claim Rejections - 35 USC §103*

Claims 1-2 stand rejected under 35 USC § 103(a) as being unpatentable over US Patent No. 7,154,966 (hereafter "Malm et al.") in view of US Patent No. 6,704,353 (hereafter "McCarty, Jr. et al."). The Applicants respectfully disagree.

Malm et al. teaches a method and system for detection of M-QAM signals by estimating M-QAM symbol constellation decision boundaries. Malm et al. estimates the decision boundaries by estimating a reference point $\hat{D}$ by summing the absolute values of the real and imaginary parts of the received symbol values and dividing the sum by 2 times the number of received symbols N.

McCarty, Jr. et al. discloses a method of removing a distortion component from a received M-QAM signal by canceling magnitude variations. A magnitude tracker in a receiver determines a magnitude value for each received symbol to compensate for multipath variations, and an FIR filter takes a localized average of the magnitude values over a window of symbols.

Claims 1 and 2 are directed to a method for efficiently demodulating a received M-QAM signal by estimating the amplitude of the received M-QAM signal. As described in claim 1, the amplitude of the received M-QAM signal is estimated using known phase information of the transmitted symbols ($d_k$) by recovering the received symbols ($r_k$), generating a set of products based on the received signals, summing and determining the real part of the sum of products, summing the absolute values of the transmitted symbols $|(d_k)|$ to generate a magnitude value and dividing the real part of the sum of products by the magnitude value.

Malm et al. does not teach the claimed method of estimating the amplitude of the received M-QAM signal because Malm et al. does not teach or suggest using known phase and symbol information of the transmitted symbols. According to Malm et al., the received symbol values $d_k$ are estimated according to expressions (1)-(3) of Column 6; please note that (received symbol value $d_k$ of Malm et al. should not be confused with the transmitted symbol notation ($d_k$) of the present claims). Thereafter, the decision boundary point $\hat{D}$ is estimated in expression (4a) by simply taking the average of the absolute values of the real and imaginary components of the received symbols.

In contrast, the present claims use knowledge of the transmitted symbols ($d_k$), including the phase of the transmitted symbols $\theta(d_k)$, in order to provide a better estimate of the amplitude of the received M-QAM signal. As shown in present Equation (2) in paragraph [0026], an exponential of the phase of the transmitted symbol $\exp[-j\theta(d_k)]$ is multiplied by the corresponding received signal $r_k$, and this product is summed over the number of received symbols N. The real value of the sum is then divided by the sum of the absolute value of the transmitted symbols ($d_k$) in order to provide the amplitude estimate. Malm et al. does not teach or suggest using knowledge of the transmitted symbols, as per the present claims.

Moreover, as asserted by the Examiner, Malm et al. does not teach or suggest dividing a sum of products by a magnitude value equal to the sum of the absolute values of the transmitted symbols $|d_k|$.

The Examiner asserts that McCarty, Jr. et al. teaches summing the absolute values of the transmitted symbols. The Applicants respectfully disagree because McCarty, Jr. et al. only teaches the summing of magnitude values of received symbols. As shown in Figs. 1 and 2 of McCarty, Jr. et al., a magnitude tracker 110 in a receiver 100 is used to estimate for each received symbol an error correction factor to compensate for variations induced by multipath (see Column 4, lines 5-10). As described in Column 4, lines 39-62, the magnitude of the I and Q pair of each received symbol is calculated in block 202 of the magnitude tracker 110 and an average of the magnitudes of the received symbols is taken over a window of n symbols using FIR filter 204 as shown in Column 4, line 57. Therefore, McCarty, Jr. et al. does not teach or suggest taking a sum of the absolute values of the transmitted symbols. Furthermore, McCarty, Jr. et al. does not disclose using a sum of absolute values of transmitted symbols in a denominator to estimate the amplitude of a received M-QAM signal.

Present claim 1 requires:

> ...
> summing the absolute values of the transmitted symbols $|(d_k)|$ to generate a magnitude value; and
> generating the estimated amplitude of the received M-QAM signal by dividing the real part of the sum of products by the magnitude value.

(Emphasis added.)

As discussed above, the features of present claims 1 and 2 of exploiting knowledge of the transmitted symbols and phase to estimate the amplitude of an M-

QAM signal are simply not taught by the prior art and results in an improved amplitude estimate.

Based on the arguments presented above, withdrawal of the 35 USC § 103(a) rejection of claims 1-2 over Malm et al. in view of McCarty, Jr. Et al. is respectfully requested.

***Conclusion***

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience. In view of the foregoing amendment and remarks, Applicants respectfully submit that the present application, including claims 1-14, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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